

AbstractID: 11833 Title: Computer-Aided Image Texture Analysis as an Indicator of Image Quality: A Feasibility Study in FFDM

Purpose: Image quality is often quantified using signal-to-noise-ratio (SNR). We hypothesize that clinical image texture features are also reflective of image quality. To test feasibility, we investigated the relationship between quantitative image texture features and SNR as a function of acquisition parameters for a full-field digital mammography (FFDM) system. **Method and Materials:** An anthropomorphic breast phantom (Model 169, Gammex RMI, Madison, WI) was imaged with a Senographe 2000D (General Electric Medical Systems, Chalfont St. Giles, UK). Images were acquired with various target/filter, kV (25 – 32 kV) and mAs combinations. The mAs was varied from 10 to 300% of that required for a standard phototimed exposure yielding an average glandular dose (AGD) of 1.8 mGy. SNR was computed in a 2.5cm² retroareolar region of interest (ROI) segmented from linear images after flat-field and offset correction. Signal intensity was computed as the average pixel value in the ROI. Noise was computed as the RMS difference of two images acquired using the same acquisition parameters. Image texture features of skewness, coarseness, contrast, energy, homogeneity, and fractal dimension were computed in the corresponding ROI from the *Premium View*TM processed FFDM images. **Results:** Homogeneity decreases continuously as a function of mAs. Skewness, coarseness, and fractal dimension increase, while contrast and energy decrease, until all reach a threshold. The threshold occurs between 40-100% of the phototimed AGD, beyond which no further change is seen. Linear regressions with mAs were strong after logarithmic transformation, having $R^2 \geq 0.84$, $p < 0.001$ for coarseness, energy, and homogeneity. **Conclusions:** Clinical texture features are indicative of image quality. While homogeneity correlates closely with SNR, other texture features reach a threshold, seeming to indicate optimal dose settings. Further work is underway to fully investigate the potential use of image texture as an indicator of clinically acceptable FFDM image quality.